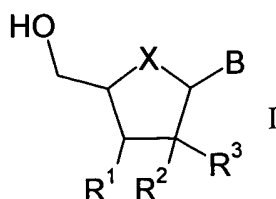


Claims

1. A method for the treatment of hepatitis C infection comprising administering a therapeutically effective amount of a compound of the formula:



wherein

R^1 is hydrogen, hydroxy, alkyl, hydroxyalkyl, alkoxy, halogen, cyano, isocyano or azido;

R^2 is hydrogen, hydroxy, alkoxy, chlorine, bromine or iodine;

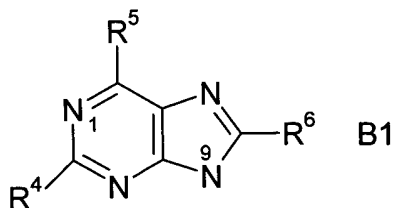
R^3 is hydrogen; or

R^2 and R^3 together represent $=CH_2$; or

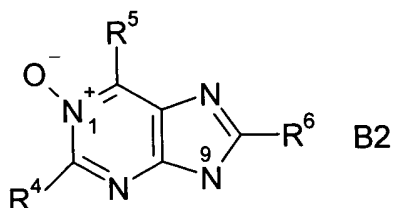
R^2 and R^3 represent fluorine;

X is O, S or CH_2 ; and

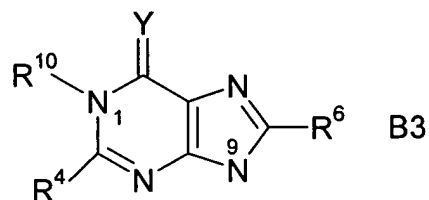
B is a purine base B1 which is connected through the 9-nitrogen of formula



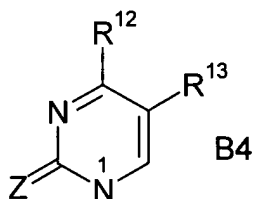
or B is an oxidised purine base B2 which is connected through the 9-nitrogen of formula



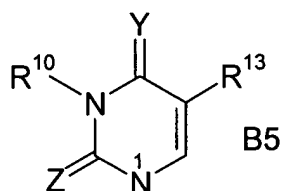
or B is a purine base B3 which is connected through the 9-nitrogen of formula



or B is a pyrimidine base B4 which is connected through the 1-nitrogen of formula



or B is a pyrimidine base B5 which is connected through the 1-nitrogen of formula



wherein

R⁴ is hydrogen, hydroxy, alkyl, alkoxy, alkylthio, aryloxy, arylthio, heterocyclyl, NR⁷R⁸, halogen or SH;

R⁵ is hydrogen, hydroxy, alkyl, haloalkyl, cycloalkyl, alkoxy, alkylthio, aryl, aryloxy, arylthio, heterocyclyl, heterocyclylamino, halogen, NR⁷R⁸, NHOR⁹, NHNR⁷R⁸ or SH;

R⁶ is hydrogen, hydroxy, alkyl, alkoxy, alkylthio, aryloxy, arylthio, heterocyclyl, NR⁷R⁸, halogen, SH or cyano;

R⁷ and R⁸ are independently of each other hydrogen, alkyl, aryl, hydroxyalkyl, alkenylalkyl, alkynylalkyl, cycloalkyl or acyl;

R⁹ is hydrogen, alkyl or aryl;

R¹⁰ is hydrogen, alkyl or aryl;

Y is O, S or NR¹¹;

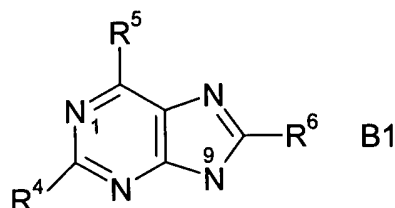
R¹¹ is hydrogen, hydroxy, alkyl, OR⁹, heterocyclyl or NR⁷R⁸;

Z is O or S;

R^{12} is hydrogen, hydroxy, alkyl, alkoxy, haloalkyl, alkylthio, aryl, aryloxy, arylthio, heterocyclyl, heterocyclylamino, halogen, NR^7R^8 , $NHOR^9$, $NHNR^7R^8$ or SH ; and R^{13} is hydrogen, alkyl, hydroxyalkyl, alkoxyalkyl, haloalkyl, cycloalkyl or halogen and the hydrolyzable esters, hydrolyzable ethers and pharmaceutically acceptable salts thereof.

2. The method according to claim 1 wherein

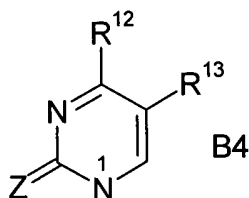
B is a purine base B1 which is connected through the 9-nitrogen of formula



wherein

R^4 is not NH_2 and R^5 is not $NH(CH_3)$; or

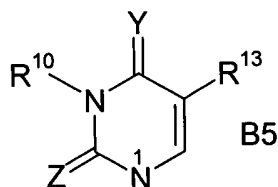
B is a pyrimidine base B4 which is connected through the 1-nitrogen of formula



wherein

R^{12} is not hydroxy, alkoxy, $N(CH_3)_2$, $N(H)NH(CH_3)$ or $N(H)NH_2$ and R^{13} is not hydroxyalkyl, chlorine or bromine; or

B is a pyrimidine base B5 which is connected through the 1-nitrogen of formula



wherein

R^{10} is not methyl or hydroxyethyl.

3. The method according to claim 1 wherein

R¹ is hydrogen, hydroxy, alkyl, hydroxyalkyl, alkoxy, halogen;

R² is hydrogen, hydroxy, alkoxy, chlorine, bromine or iodine;

R³ is hydrogen; or

R² and R³ are fluorine; and

X is O.

4. The method according to claim 1 wherein

R¹ is hydroxy;

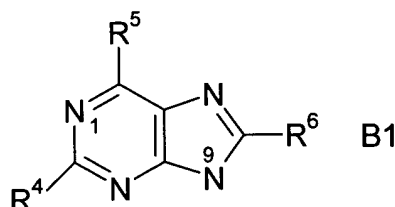
R² is hydroxy;

R³ is hydrogen; and

X is O.

5. The method according to claim 1 wherein

B is a purine base B1 which is connected through the 9-nitrogen of formula



wherein

R⁴ is hydrogen, hydroxy, alkyl, alkoxy, alkylthio, aryloxy, arylthio, heterocyclyl, NR⁷R⁸, halogen or SH;

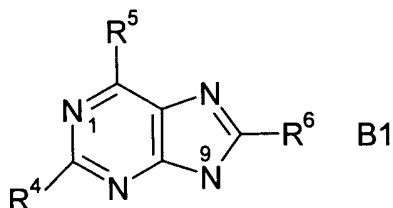
R⁵ is hydrogen, hydroxy, alkyl, haloalkyl, cycloalkyl, alkoxy, alkylthio, aryl, aryloxy, arylthio, heterocyclyl, heterocyclylamino, halogen, NR⁷R⁸, NHOR⁹, NHNR⁷R⁸ or SH;

R⁶ is hydrogen, hydroxy, alkyl, alkoxy, alkylthio, aryloxy, arylthio, heterocyclyl, NR⁷R⁸, halogen, SH or cyano;

R⁷ and R⁸ are independently of each other hydrogen, alkyl, aryl, hydroxyalkyl, alkenylalkyl, alkynylalkyl, cycloalkyl or acyl;

R⁹ is hydrogen, alkyl or aryl.

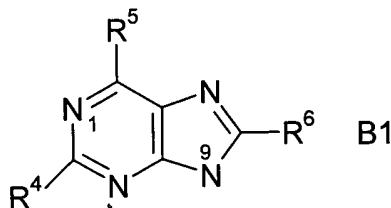
6. The method according to claim 1 wherein
B is a purine base B1 which is connected through the 9-nitrogen of formula



wherein

R⁴ is hydrogen, chlorine or NH₂;
R⁵ is hydroxy, alkylthio, aryl, heterocyclyl, halogen, NR⁷R⁸ or SH;
R⁶ is hydrogen, halogen, heterocyclyl or NR⁷R⁸;
R⁷ and R⁸ are independently of each other hydrogen, alkyl, aryl, alkenylalkyl or alkynylalkyl.

7. The method according to claim 1 wherein
B is a purine base B1 which is connected through the 9-nitrogen of formula



wherein

R⁴ is hydrogen;
R⁵ is alkylthio, aryl, heterocyclyl, halogen or NR⁷R⁸;
R⁶ is hydrogen or halogen;
R⁷ and R⁸ are independently of each other hydrogen, alkyl, alkenylalkyl or alkynylalkyl.

8. The method according to claim 2 wherein
B is the purine base B1.

9. The method according to claim 8 wherein

R^4 is hydrogen or chlorine;

R^5 is hydroxy, alkylthio, aryl, heterocyclyl, halogen, NR^7R^8 or SH;

R^6 is hydrogen, halogen, heterocyclyl or NR^7R^8 ;

R^7 and R^8 are independently of each other hydrogen, alkyl, aryl, alkenylalkyl or alkynylalkyl.

10. The method according to claim 9 wherein

R^4 is hydrogen;

R^5 is alkylthio, aryl, heterocyclyl, halogen or NR^7R^8 ;

R^6 is hydrogen or halogen;

R^7 and R^8 are independently of each other hydrogen, alkyl, alkenylalkyl or alkynylalkyl.

11. The method according to claim 1 wherein the compound is selected from the group consisting of:

6-Dimethylamino-9-(β -D-ribofuranosyl)purine,

6-[1(S)-Methyl-2-phenylethylamino]-9-(β -D-ribofuranosyl)purine,

3'-Deoxyadenosine,

6-(Phenylethylamino)-9-(β -D-ribofuranosyl)purine,

6-(Cyclohexylamino)-9-(β -D-ribofuranosyl)purine,

2-Chloroadenosine,

9-(β -D-Ribofuranosyl)purine,

8-Bromoadenosine,

8-Bromo-2'-deoxyadenosine,

8-Bromoguanosine,

6-Thioinosine,

6-Methylthio-9-(β -D-ribofuranosyl)purine,

6-Chloro-9-(β -D-ribofuranosyl)purine,

2-Amino-6-chloro-9-(β -D-ribofuranosyl)purine,
 6-(N-Methylpropylamino)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(4-thiomorpholinyl)purine,
 6-(N-Methyl-2-propenylamino)-9-(β -D-ribofuranosyl)purine,
 6-(N-Methyl-2-propynylamino)-9-(β -D-ribofuranosyl)purine,
 6-(4-Morpholinyl)-9-(β -D-ribofuranosyl)purine,
 6-Diethylamino-9-(β -D-ribofuranosyl)purine,
 6-(1(R,S)-Phenylethylamino)-9-(β -D-ribofuranosyl)purine,
 6-(1-Benzyl-1-methylethylamino)-9-(β -D-ribofuranosyl)purine,
 6-(3-Phenylpropylamino)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-[2-(2-thienyl)ethylamino]purine,
 6-Dibenzylamino-9-(β -D-ribofuranosyl)purine,
 6-Hexylamino-9-(β -D-ribofuranosyl)purine,
 6-(3-Pyridylmethylanino)-9-(β -D-ribofuranosyl)purine,
 6-[4-(4-Fluorophenyl)-1,2,5,6-tetrahydropyridyl]-9-(β -D-ribofuranosyl)purine,
 6-[4-(2-Methoxyphenyl)piperazinyl]-9-(β -D-ribofuranosyl)purine,
 6-[2-(3-Indolyl)ethylamino]-9-(β -D-ribofuranosyl)purine,
 6-[2-(4-Chlorophenyl)ethylamino]-9-(β -D-ribofuranosyl)purine,
 6-(N-Methylphenylamino)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(1,2,4,5-tetrahydro-3H-benzazepin-3-yl)purine,
 9-(β -D-Ribofuranosyl)-6-(1,2,3,4-tetrahydro-2-isoquinolyl)purine,
 6-(4-Methylpiperazinyl)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(1,3,4,5-tetrahydro-2H-benzazepin-2-yl)purine,
 6-[2-(4-Cyanomethylphenyl)ethylamino]-9-(β -D-ribofuranosyl)purine,
 6-(2,3-Dihydro-1-indolyl)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(2,3,4,5-tetrahydro-1,4-benzothiazepin-4-yl)purine,

9-(β -D-Ribofuranosyl)-6-(2,3,4,5-tetrahydro-1,4-benzoxazepin-4-yl)purine,
 6-(8-Aminosulphonyl-2,3,4,5-tetrahydro-1H-2-benzazepin-2-yl)-9-(β -D-
 ribofuranosyl)purine,
 6-[2-(3,4-Dimethoxyphenyl)ethylamino]-9-(β -D-ribofuranosyl)purine,
 6-[2-(4-Hydroxyphenyl)ethylamino]-9-(β -D-ribofuranosyl)purine,
 6-(2-Isoindoliny)-9-(β -D-ribofuranosyl)purine,
 6-(7-Aminosulphonyl-2,3,4,5-tetrahydro-1H-benzazepin-3-yl)-9-(β -D-
 ribofuranosyl)purine,
 6-(N-Cyclohexylmethylamino)-9-(β -D-ribofuranosyl)purine,
 6-(N-Hexylmethylamino)-9-(β -D-ribofuranosyl)purine,
 6-(10,11-Dihydro-5H-dibenzo[a,d]cyclohepten-5-ylamino)-9-(β -D-ribofuranosyl)purine,
 6-[N-(10,11-Dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)methylamino]-9-(β -D-
 ribofuranosyl)purine,
 6-[N-(5-Aminopentyl)methylamino]-9-(β -D-ribofuranosyl)purine,
 6-[(5-Chloro-2-methoxyphenyl)methylamino]-9-(β -D-ribofuranosyl)purine,
 6-[(2-Methylphenyl)methylamino]-9-(β -D-ribofuranosyl)purine,
 6-(Hexamethyleneimino)-9-(β -D-ribofuranosyl)purine,
 6-(1-Pyrrolidinyl)-9-(β -D-ribofuranosyl)purine,
 6-(4-Hydroxypiperidin-1-yl)-9-(β -D-ribofuranosyl)purine,
 6-(1-Piperidinyl)-9-(β -D-ribofuranosyl)purine,
 6-(2-Propenyl)amino-9-(β -D-ribofuranosyl)purine,
 6-(2-Propynyl)amino-9-(β -D-ribofuranosyl)purine,
 6-(1-Methyl)ethylamino-9-(β -D-ribofuranosyl)purine,
 6-bis-(2-Propenyl)amino-9-(β -D-ribofuranosyl)purine,
 6-(2-Phenylethyl)methylamino-9-(β -D-ribofuranosyl)purine,
 6-Ethylmethylamino-9-(β -D-ribofuranosyl)purine,
 6-bis-[(3-Methyl)butylamino]-9-(β -D-ribofuranosyl)purine,

6-(4-Aminophenyl)methylamino-9-(β -D-ribofuranosyl)purine,
 6-(2-Pyridylmethyl)amino-9-(β -D-ribofuranosyl)purine,
 6-(2-Hydroxyethyl)methylamino-9-(β -D-ribofuranosyl)purine,
 6-Dipropylamino-9-(β -D-ribofuranosyl)purine,
 6-[2-Phenyl-(N-propionyl)ethylamino]-9-(β -D-ribofuranosyl)purine,
 6-(N-Benzoyl-2-phenylethylamino)-9-(β -D-ribofuranosyl)purine,
 2-Amino-6-methylamino-9-(β -L-ribofuranosyl)purine,
 2-Amino-6-methylamino-9-(β -D-ribofuranosyl)purine,
 2-Amino-6-(4-morpholinyl)-9-(β -D-ribofuranosyl)purine,
 2-Amino-6-(1-pyrrolidinyl)-9-(β -D-ribofuranosyl)purine,
 2,6-Diamino-9-(β -L-ribofuranosyl)purine,
 2,6-Diamino-9-(β -D-ribofuranosyl)purine,
 2-Chloro-6-(1-pyrrolidinyl)-9-(β -D-ribofuranosyl)purine,
 2-Chloro-6-(1-hexamethyleneimino)-9-(β -D-ribofuranosyl)purine,
 2-Chloro-6-(4-hydroxy-1-piperidinyl)-9-(β -D-ribofuranosyl)purine,
 6-[(N-Cyclohexyl)methylamino]-2-methylthio-9-(β -D-ribofuranosyl)purine,
 6-(1-Pyrrolyl)-9-(β -D-ribofuranosyl)purine,
 6-(1-Pyrrolyl)-9-(β -D-arabinofuranosyl)purine,
 6-(1-Pyrrolyl)-9-(β -D-ribofuranosyl)purin-8-(7H)-one,
 9-(3-Deoxy- β -D-ribofuranosyl)-6-(1-pyrrolyl) purine,
 6-(1-Pyrrolyl)-9-(β -L-ribofuranosyl)purine,
 6-(1-Indolyl)-9-(β -D-ribofuranosyl)purine,
 6-(1-Imidazolyl)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(1,2,4-triazol-1-yl)purine,
 6-(1-Pyrazolyl)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl) 6-(1,2,4-triazol-4-yl)purine,

6-Methylamino-9-(β -D-ribofuranosyl)purin-2(1H)-one,
 2-Methoxy-6-methylamino-9-(β -D-ribofuranosyl)purine,
 2-Methoxyadenosine,
 2,6-Dichloro-9-(β -D-ribofuranosyl)purine,
 6-Methoxy-9-(β -D-ribofuranosyl)purine,
 2-Amino-6-benzylthio-9-(β -D-ribofuranosyl)purine,
 6-Benzylthio-2-hydroxy-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)purine-2,6,8(1H,3H,7H)-trione,
 8-(Methylamino)adenosine,
 8-(2-Phenylethylamino)adenosine,
 8-Benzylaminoadenosine,
 8-(1-Piperidinyl)adenosine,
 8-(Dimethylamino)adenosine,
 8-(3-Phenylpropylamino)adenosine,
 8-(4-Morpholinyl)adenosine,
 8-(N-Methyl-2-phenylethylamino)adenosine,
 8-(3-Pyridylmethylamino)adenosine,
 8-(Ethylamino)adenosine,
 8-(1,2,3,4-Tetrahydro-2-isoquinolyl)adenosine,
 8-[2-(4-Morpholinyl)ethylamino]adenosine,
 8-(Hexylamino)adenosine,
 8-(2-Cyclohexylethylamino)adenosine,
 8-(2(R,S)-Phenylpropylamino)adenosine,
 8-[2-(4-Methylphenyl) ethylamino]adenosine,
 8-[2-(1-methyl-2-pyrrolyl) ethylamino]adenosine,
 8-[2-(4-Aminosulphonylphenyl) ethylamino]adenosine,
 8-(4-Phenyl-1-piperazinyl)adenosine,
 8-(2-(4-Imidazolyl)adenosine,
 8-(1-Naphthylmethylamino)adenosine,
 8-[2-(4-Hydroxyphenyl)ethylamino]adenosine,

8-(4-Phenylbutylamino)adenosine,
 8-[2-(4-Chlorophenyl)ethylamino]adenosine,
 8-[2-(2,4-Dichlorophenyl)ethylamino]adenosine,
 8-(2-Propenylamino)adenosine,
 8-(2-Hydroxyethylamino)adenosine,
 8-(1(R)-Methyl-2-phenylethylamino)adenosine,
 8-(4-Fluorobenzylamino)adenosine,
 8-[(4-Hydroxycarbonyl)benzylamino]adenosine,
 8-(2-Propynylamino)adenosine,
 8-(1-Methylethylamino)adenosine,
 8-[(4-Trifluoromethyl)benzylamino]adenosine,
 8-[(2,5-Dimethoxy)benzylamino]adenosine,
 8-[2-(2-Thienyl)ethylamino]adenosine,
 8-[2-(4-Aminophenyl)ethylamino]adenosine,
 8-(2-Phenoxyethylamino)adenosine,
 8-[(2-Thienyl)methylamino]adenosine,
 8-[(4-tert-Butyl)benzylamino]adenosine,
 8-(1(R)-Phenylethylamino)adenosine,
 8-(1(S)-Phenylethylamino)adenosine,
 8-(6-Phenylhexylamino)adenosine,
 8-[2-Hydroxy-1(S)-phenyl]ethylamino]adenosine,
 2'-Deoxy-8-(2-phenylethylamino)adenosine,
 2'-Deoxy-8-(3-phenylpropylamino)adenosine,
 8-Benzylamino-2'-deoxyadenosine,
 2'-Deoxy-8-(4-phenylbutylamino)adenosine,
 2'-Deoxy-8-(6-phenylhexylamino)adenosine,
 8-(4-Morpholinyl)inosine,
 8-(Methylthio)adenosine,
 8-(Benzylthio)adenosine,
 8-(Benzyloxy)adenosine,
 8-Ethoxyadenosine,

8-[(1-Hydroxy-1-methyl)ethyl]adenosine,
 9-(β -D-ribofuranosyl)-6-(3-thienyl)purine,
 6-Phenyl-9-(β -D-ribofuranosyl) purine,
 6-(4-Fluorophenyl)-9-(β -D-ribofuranosyl) purine,
 6-(4-Chlorophenyl)-9-(β -D-ribofuranosyl) purine,
 6-(4-Methylphenyl)-9-(β -D-ribofuranosyl) purine,
 6-(4-Methoxyphenyl)-9-(β -D-ribofuranosyl) purine,
 9-(β -D-Ribofuranosyl)-6-(1-thianthrenyl)purine,
 6-(4-Biphenyl)-9-(β -D-ribofuranosyl) purine,
 6-(4-Methylthiophenyl)-9-(β -D-ribofuranosyl) purine,
 6-(2-Methylphenyl)-9-(β -D-ribofuranosyl) purine,
 6-(9-Phenanthrenyl)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(3-trifluoromethylphenyl)purine,
 6-(2-Phenoxyphenyl)-9-(β -D-ribofuranosyl) purine,
 6-(4-tert-Butylphenyl)-9-(β -D-ribofuranosyl) purine,
 9-(β -D-Ribofuranosyl)-6-(2-trifluoromethoxyphenyl)purine,
 6-(4-Phenoxyphenyl)-9-(β -D-ribofuranosyl)purine,
 6-(3-Methoxyphenyl)-9-(β -D-ribofuranosyl) purine,
 6-(2-Naphthyl)-9-(β -D-ribofuranosyl)purine,
 6-(3-Biphenyl)-9-(β -D-ribofuranosyl)purine,
 6-[4-(2-Methylpropyl)phenyl]-9-(β -D-ribofuranosyl)purine,
 6-(3-Fluorophenyl)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(4-trifluoromethylphenyl)purine,
 6-(3-Ethoxyphenyl)-9-(β -D-ribofuranosyl)purine,
 6-[3-(1-Methyl)ethylphenyl]-9-(β -D-ribofuranosyl)purine,
 9-(β -D-ribofuranosyl)-6-(4-trifluoromethoxyphenyl)purine,
 6-(4-Ethylphenyl)-9-(β -D-ribofuranosyl)purine,

2-Amino-6-phenyl-9-(β -D-ribofuranosyl)purine,
6-Ethylamino-9-(β -D-ribofuranosyl)purine, and
6-Propylamino-9-(β -D-ribofuranosyl)purine.

12. The method according to claim 1 wherein B is the oxidized purine base B2.

13. The method according to claim 12 wherein

R^4 is hydrogen;

R^5 is hydrogen, alkyl, heterocyclyl or NR^7R^8 ;

R^6 is hydrogen;

R^7 and R^8 are independently of each other hydrogen, alkyl, aryl, hydroxyalkyl, alkenylalkyl, alkynylalkyl, cycloalkyl or acyl.

14. The compound according to claim 13 which compound is
Adenosine-1-oxide, or

6-(2-Phenylethylamino)- 9-(β -D-ribofuranosyl)purine-1-oxide.

15. The method according to claim 1 wherein B is the purine base B3.

16. The method according to claim 15 wherein

R^4 is hydrogen, NR^7R^8 or hydroxy;

R^6 is hydrogen, halogen or NR^7R^8 ;

R^7 and R^8 are independently of each other hydrogen or alkyl;

R^{10} is hydrogen or alkyl;

Y is O, S, NH or N-alkyl.

17. The method according to claim 1 wherein the compound is

3'-Deoxyguanosine,

6-Thioguanosine,

Inosine,

L-Inosine,

8-Bromoinosine,

1-Benzyl-6-imino-9-(β -D-ribofuranosyl)purine,

1-Methyl-6-(2-phenylethylimino)-9-(β -D-ribofuranosyl)purine,

2-(Acetylamino)inosine, or

8-(Benzylamino)inosine.

18. The method according to claim 1 wherein B is the pyrimidine base B4.

19. The method according to claim 18 wherein

Z is O;

R^{12} is hydroxy, alkyl, heterocyclyl, NR^7R^8 , $NHOR^9$, heterocyclylamino, $NHNR^7R^8$ or SH;

and

R^{13} is hydrogen, alkyl or halogen.

20. The method according to claim 19 wherein

R^{12} is hydroxy, alkyl or NR^7R^8 ;

R^{13} is hydrogen;

R^7 and R^8 are independently of each other hydrogen or alkyl.

21. The method according to claim 1 wherein

R^1 is hydrogen, halogen, hydroxy, alkyl, alkoxy, cyano or azido;

R^2 is hydrogen or hydroxy; or

R^2 and R^3 represent fluorine;

X is O or CH₂;

B is the pyrimidine base B4;

Z is O;

R¹² is NR⁷R⁸;

R¹³ is hydrogen, alkyl or halogen;

R⁷ and R⁸ are independently of each other hydrogen or alkyl.

22. The method according to 21 wherein

R¹³ is hydrogen, C₁₋₄-alkyl or fluorine;

R⁷ and R⁸ are independently of each other hydrogen or C₁₋₄-alkyl.

23. The method according to claim 2 wherein

B is the pyrimidine base B4;

R¹² is hydrogen, alkyl, haloalkyl, alkylthio, aryl, aryloxy, arylthio, heterocyclyl, heterocyclylamino, halogen, NR⁷R⁸, NHOR⁹, NHNR⁷R⁸ or SH;

24. The method according to claim 23 wherein

Z is O;

R¹² is alkyl, heterocyclyl, NR⁷R⁸, NHOR⁹, heterocyclylamino, NHNR⁷R⁸ or SH; and

R¹³ is hydrogen, alkyl or halogen.

25. The method according to claim 24 wherein

R¹² is alkyl or NR⁷R⁸;

R¹³ is hydrogen; and

R⁷ and R⁸ are independently of each other hydrogen or alkyl.

26. The method according to claim 1 wherein the compound is

4-Thiouridine,
 5-Fluorocytidine,
 1-(β -D-arabinofuranosyl)-5-fluorocytosine,
 5-Methylcytidine,
 2',3'-Dideoxycytidine,
 N4-Acetylcytidine,
 3'-Deoxycytidine,
 4-Methoxy-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 4-Methylthio-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 5-Fluoro-4-methylthio-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 5-Methyl-4-methylthio-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 3'-Azido-2',3'-dideoxy-5-methylcytidine,
 1-(3-Deoxy- β -L-threo-pentofuranosyl)-5-fluorocytosine,
 4-Methylamino-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 5-Fluoro-4-methylamino-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 4-(1-Pyrrolyl)-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 1-(2-Deoxy-2,2-difluoro- β -D-erythropentofuranosyl)cytosine,
 4-Amino-1(R)-(2(S),3(R)-dihydroxy-4(R)-hydroxymethyl-cyclopentyl)-1H-pyrimidin-2-one,
 1-(β -D-Xylofuranosyl)cytosine,
 1-(3-Deoxy-3-fluoro- β -D-xylofuranosyl)cytosine, or
 3'-Deoxy-3'-hydroxymethylcytidine.

27. The method according to claim 2 wherein

R¹ is hydrogen, halogen, hydroxy, alkyl, alkoxy, cyano or azido;
 R² is hydrogen or hydroxy; or
 R² and R³ represent fluorine;

X is O or CH₂;

B is the pyrimidine base B4;

Z is O;

R¹² is NR⁷R⁸;

R¹³ is hydrogen, alkyl or halogen; and

R⁷ and R⁸ are independently of each other hydrogen or alkyl;

28. The method according to claim 27 wherein

R¹ is hydrogen, fluorine, hydroxy, C₁₋₄-alkyl, C₁₋₄-alkoxy, cyano or azido;

R¹³ is hydrogen, C₁₋₄-alkyl or fluorine; and

R⁷ and R⁸ are independently of each other hydrogen or C₁₋₄-alkyl.

29. The method according to claim 28 wherein the compound is

L-Cytidine, or

4-Amino-1-(2,2-difluoro-3-hydroxy-4-hydroxymethyl-cyclopentyl)-1H-pyrimidin-2-one.

30. The method according to claim 1, wherein B is the pyrimidine base B5.

31. The method according to claim 30 wherein

wherein

Y is O or NR¹¹;

Z is O;

R¹⁰ is hydrogen; and

R¹³ is hydrogen, alkyl or halogen.

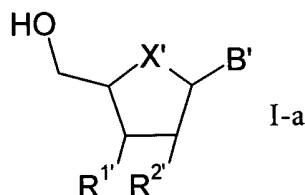
32. The method according to claim 2 wherein B is the pyrimidine base B5.

33. The method according to claim 1 wherein the compound is

2'-Deoxy-5-fluorouridine,
1-(β -D-Arabinofuranosyl)-5-fluorouracil,
5-Fluorouridine,
5-Bromouridine,
3-Methyluridine,
5-Methyluridine,
1-(β -D-Arabinofuranosyl)uracil,
1-(β -D-Arabinofuranosyl)-5-methyluracil,
1-(β -D-Arabinofuranosyl)-5-iodouracil,
3'-Deoxy-5-methyluridine,
5-Ethyluridine,
5-[(1-Methyl)ethyl]uridine,
5-Methoxymethyluridine,
5-Ethoxymethyluridine,
5-Chlorouridine,
5-Methyl-1-(β -L-ribofuranosyl)uracil,
1-(β -D-Arabinofuranosyl)-5-ethyluracil,
1-(β -D-Arabinofuranosyl)-5-bromo uracil,
5-Methyl-4-thiouridine,
5-Fluoro-4-thiouridine,
1-(2-Deoxy - α -D-erthyro-pentofuranosyl)-5-fluorouracil,
2'-Deoxy-5-fluoro-3-methyluridine,
1-(α -D-Erthyro-2-deoxypentofuranosyl)-5-fluoro-3-methyluracil,
2'-Chloro-2'-deoxyuridine,
2'-Bromo-2'-deoxyuridine,
1-(2-Deoxy- β -D-lyxofuranosyl)-5-methyluracil,
3'-Deoxy-3'-fluoro-5-methyluridine,

2',3'-Dideoxy-5-ethyl-3'-methoxyuridine,
 5'-Benzyloxy-2',3'-dideoxy-5-methyluridine,
 2',3'-Dideoxy-5-ethyl-3'-iodouridine,
 3'-Azido-2',3'-dideoxy-5-ethyluridine,
 4-Oximino-1-(β -L-ribofuranosyl)pyrimidin-2(1H)-one,
 4-Oximino-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 4-Oximino-1-(β -D-arabinofuranosyl)pyrimidin-2(1H)-one,
 5-Fluoro-4-oximino-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 1-(2-Deoxy-2,2-difluoro- α -D-erythropentofuranosyl)uracil,
 1-(3-Deoxy-3-fluoro- β -D-xylofuranosyl)uracil, or
 2'-Deoxy-2'-methoxyuridine.

34. A compound of the formula I-a



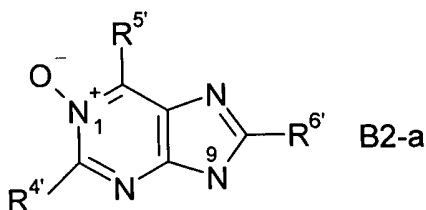
wherein

R^{1'} is hydroxy;

R^{2'} is hydroxy;

X' is O;

B' is an oxidized purine base B2-a which is connected through the 9-nitrogen of formula



wherein

R^{4'} is hydrogen;

R^{5'} is NHR^{8'};

$R^{6''}$ is hydrogen;

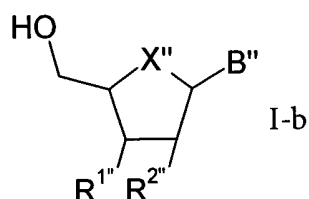
$R^{8''}$ is alkyl;

and the hydrolyzable esters, hydrolyzable ethers, and pharmaceutically acceptable salts thereof.

35. The compound according to claim 34 which is:

6-(2-phenylethylamino)- 9-(β -D-ribofuranosyl)purine-1-oxide.

36. A compound of the formula I-b



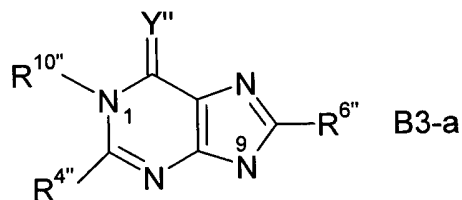
wherein

$R^{1''}$ is hydroxy;

$R^{2''}$ is hydroxy;

X'' is O;

B'' is a purine base B3-a which is connected through the 9-nitrogen of formula



wherein

$R^{4''}$ is hydrogen;

$R^{6''}$ is hydrogen;

$R^{10''}$ is alkyl;

Y'' is $NR^{11''}$;

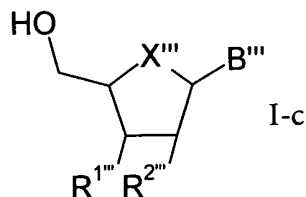
$R^{11''}$ is alkyl;

and the hydrolyzable esters, hydrolyzable ethers, and pharmaceutically acceptable salts thereof.

37. The compound according to claim 36 which is:

1-Methyl-6-(2-phenylethylimino)-9-(β -D-ribofuranosyl)purine.

38. A compound of the formula I-c



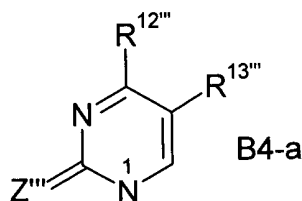
wherein

R^{1'''} is hydroxy;

R^{2'''} is hydroxy;

X''' is O;

B''' is a pyrimidine base B4-a which is connected through the 1-nitrogen of formula



wherein

R^{12'''} is alkylthio or heterocyclyl;

R^{13'''} is hydrogen, alkyl or halogen;

Z''' is O;

and the hydrolyzable esters or ethers thereof and pharmaceutically acceptable salts thereof.

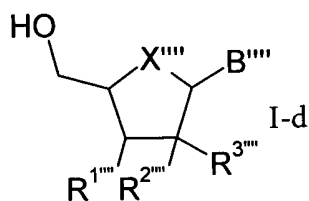
39. The compound according to claim 38 which compound is

5-Fluoro-4-methylthio-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,

5-Methyl-4-methylthio-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one, or

4-(1-Pyrrolyl)-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one.

40. A compound of the formula I-d



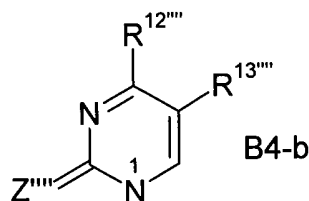
wherein

R^{1''''} is hydrogen, halogen, hydroxy, alkyl, alkoxy, cyano or azido;

R^{2''''} and R^{3''''} represent fluorine;

X^{''''} is O or CH₂;

B^{''''} is a pyrimidine base B4-b which is connected through the 1-nitrogen of formula



wherein

Z^{''''} is O;

R^{12''''} is NR^{7''''}R^{8''''};

R^{13''''} is hydrogen, alkyl or halogen;

R^{7''''} and R^{8''''} are independently of each other hydrogen or alkyl;

and the hydrolyzable esters, hydrolyzable ethers, and pharmaceutically acceptable salts thereof.

41. The compound according to claim 40

wherein

R^{1''''} is hydrogen, fluorine, hydroxy, C₁₋₄-alkyl, C₁₋₄-alkoxy, cyano or azido;

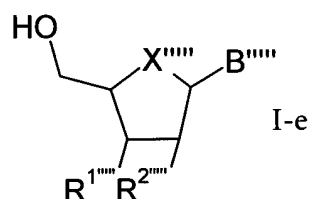
X^{''''} is CH₂;

R^{12''''} is hydrogen, C₁₋₄-alkyl or fluorine; and

R^{7''''} and R^{8''''} are independently of each other hydrogen or C₁₋₄-alkyl.

42. The compound according to claim 41 which compound is
4-Amino-1-(2,2-difluoro-3-hydroxy-4-hydroxymethyl-cyclopentyl)-1H-pyrimidin-2-one.

43. A compound of the formula I-e



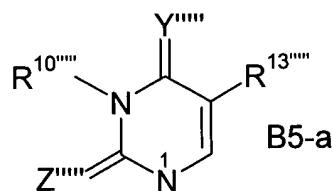
wherein

R^{1'''} is alkoxy;

R^{2'''} is hydrogen;

X^{'''} is O;

B^{''''} is a pyrimidine base B5-a which is connected through the 1-nitrogen of formula



wherein

R^{10'''} is hydrogen;

R^{13'''} is alkyl;

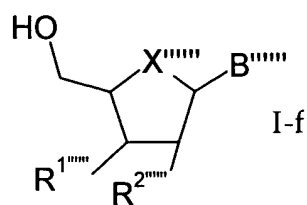
Y^{'''} is O;

Z^{'''} is O;

and the hydrolyzable esters, hydrolyzable ethers, and pharmaceutically acceptable salts thereof.

44. The compound according to claim 43 which is
2',3'-Dideoxy-5-ethyl-3'-methoxyuridine.

45. A compound of the formula I-f



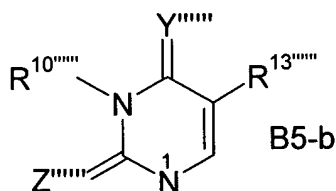
wherein

R1'''' is hydroxy;

R2'''' is hydroxy;

X'''' is O;

B'''' is a pyrimidine base B5-b which is connected through the 1-nitrogen of formula



wherein

R10'''' is hydrogen;

R13'''' is halogen;

Y'''' is NR11'''';

R11'''' is hydroxy;

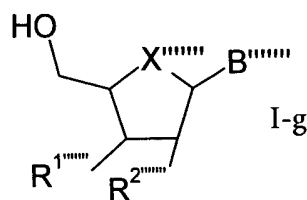
Z'''' is O;

and the hydrolyzable esters, hydrolyzable ethers, and pharmaceutically acceptable salts thereof.

46. The compound according to claim 45 which is

5-Fluoro-4-oximino-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one.

47. A compound of the formula I-g



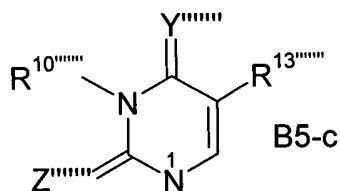
wherein

R^{1''''''} is hydroxy;

R^{2''''''} is hydroxy;

X'''''' is O;

B'''''' is a pyrimidine base B5-c which is connected through the 1-nitrogen of formula



wherein

R^{10''''''} is hydrogen;

R^{13''''''} is hydrogen;

Y'''''' is NR^{11''''''};

R^{11''''''} is hydroxy;

Z'''''' is O;

and the hydrolyzable esters, hydrolyzable ethers and pharmaceutically acceptable salts thereof.

48. The compound according to claim 47 which is
4-Oximino-1-(β-L-ribofuranosyl)pyrimidin-2(1H)-one.

49. A compound selected from the group consisting of:

6-(N-Methylpropylamino)-9-(β-D-ribofuranosyl)purine,

9-(β-D-Ribofuranosyl)-6-(4-thiomorpholinyl)purine,

6-(N-(2-Propenyl)methylamino)-9-(β-D-ribofuranosyl)purine,

6-(N-Methyl-2-propynylamino)-9-(β -D-ribofuranosyl)purine,
 6-[4-(4-Fluorophenyl)-1,2,5,6-tetrahydropyridyl]-9-(β -D-ribofuranosyl)purine,
 6-[4-(2-Methoxyphenyl)piperazinyl]-9-(β -D-ribofuranosyl)purine,
 6-(N-Methylphenylamino)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(1,2,4,5,6-(1-itetrahydro-3H-benzazepin-3-yl)purine,
 9-(β -D-ribofuranosyl)-6-(1,2,3,4-tetrahydro-2-isoquinolyl)purine,
 9-(β -D-Ribofuranosyl)-6-(1,3,4,5-tetrahydro-2H-benzazepin-2-yl)purine,
 6-[2-(4-Cyanomethylphenyl)ethylamino]-9-(β -D-ribofuranosyl)purine,
 6-(2,3-Dihydro-1-indolyl)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(2,3,4,5-tetrahydro-1,4-benzothiazepin-4-yl)purine,
 9-(β -D-Ribofuranosyl)-6-(2,3,4,5-tetrahydro-1,4-benzoxazepin-4-yl)purine,
 6-(8-Aminosulphonyl-2,3,4,5-tetrahydro-1H-2-benzazepin-2-yl)-9-(β -D-ribofuranosyl)purine,
 6-(2-Isoindolyl)-9-(β -D-ribofuranosyl)purine,
 6-(7-Aminosulphonyl-2,3,4,5-tetrahydro-1H-benzazepin-3-yl)-9-(β -D-ribofuranosyl)purine,
 6-(10,11-Dihydro-5H-dibenzo[a,d]cyclohepten-5-ylamino)-9-(β -D-ribofuranosyl)purine,
 6-[N-(10,11-Dihydro-5H-dibenzo[a,d]cyclohepten-5-yl)methylamino]-9-(β -D-ribofuranosyl)purine,
 6-[N-(5-Aminopentyl)methylamino]-9-(β -D-ribofuranosyl)purine,
 6-Ethylmethylamino-9-(β -D-ribofuranosyl)purine,
 6-bis-[(3-Methyl)butylamino]-9-(β -D-ribofuranosyl)purine,
 6-[2-Phenyl-(N-propionyl)ethylamino]-9-(β -D-ribofuranosyl)purine,
 6-(N-Benzoyl-2-phenylethylamino)-9-(β -D-ribofuranosyl)purine,
 1-Methyl-6-(2-phenylethylimino)-9-(β -D-ribofuranosyl)purine,
 2-Amino-6-methylamino-9-(β -L-ribofuranosyl)purine,
 6-[(N-Cyclohexyl)methylamino]-2-methylthio-9-(β -D-ribofuranosyl)purine,

6-(1-Pyrrolyl)-9-(β -D-ribofuranosyl)purin-8-(7H)-one,
 9-(3-Deoxy- β -D-ribofuranosyl)-6-(1-pyrrolyl) purine,
 6-(1-Pyrrolyl)-9-(β -L-ribofuranosyl)purine,
 6-(1-Indolyl)-9-(β -D-ribofuranosyl)purine,
 6-(1-Imidazolyl)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(1,2,4-triazol-1-yl)purine,
 6-(1-Pyrazolyl)- 9-(β -D-ribofuranosyl)purine,
 6-(2-Phenylethylamino)- 9-(β -D-ribofuranosyl)purine-1-oxide,
 8-(2-Phenylethylamino)adenosine,
 8-(3-Phenylpropylamino)adenosine,
 8-(4-Morpholinyl)adenosine,
 8-(N-Methyl-2-phenylethylamino)adenosine,
 8-(3-Pyridylmethylamino)adenosine,
 8-(1,2,3,4-Tetrahydro-2-isoquinolyl)adenosine,
 8-[2-(4-Morpholinyl)ethylamino]adenosine,
 8-(2-Cyclohexylethylamino)adenosine,
 8-(2(R,S)-Phenylpropylamino)adenosine,
 8-[2-(4-Methylphenyl) ethylamino]adenosine,
 8-[2-(1-methyl-2-pyrrolyl) ethylamino]adenosine,
 8-[2-(4-Aminosulphonylphenyl) ethylamino]adenosine,
 8-(4-Phenyl-1-piperazinyl)adenosine,
 8-(1-Naphthylmethylamino)adenosine,
 8-[2-(4-Hydroxyphenyl)ethylamino]adenosine,
 8-(4-Phenylbutylamino)adenosine,
 8-[2-(4-Chlorophenyl)ethylamino]adenosine,
 8-[2-(2,4-Dichlorophenyl)ethylamino]adenosine,
 8-(2-Propenylamino)adenosine,
 8-(1(R)-Methyl-2-phenylethylamino)adenosine,
 8-(4-Fluorobenzylamino)adenosine,
 8-[(4-Hydroxycarbonyl)benzylamino]adenosine,

8-(2-propynylamino)adenosine,
 8-[(4-trifluoromethyl)benzylamino]adenosine,
 8-[(2,5-Dimethoxy)benzylamino]adenosine,
 8-[2-(2-Thienyl)ethylamino]adenosine,
 8-[2-(4-Aminophenyl)ethylamino]adenosine,
 8-(2-Phenoxyethylamino)adenosine,
 8-[(2-Thienyl)methylamino]adenosine,
 8-[(4-tert-Butyl)benzylamino]adenosine,
 8-(1(R)-Phenylethylamino)adenosine,
 8-(1(S)-Phenylethylamino)adenosine,
 8-(6-Phenylhexylamino)adenosine,
 8-[2-Hydroxy-1(S)-phenyl]ethylamino]adenosine,
 2'-Deoxy-8-(2-phenylethylamino)adenosine,
 2'-Deoxy-8-(3-phenylpropylamino)adenosine,
 8-Benzylamino-2'-deoxyadenosine,
 2'-Deoxy-8-(4-phenylbutylamino)adenosine,
 2'-Deoxy-8-(6-phenylhexylamino)adenosine,
 8-Ethoxyadenosine,
 9-(β -D-Ribofuranosyl)-6-(3-thienyl)purine,
 9-(β -D-Ribofuranosyl)-6-(1-thianthrenyl)purine,
 6-(4-Biphenyl)-9-(β -D-ribofuranosyl) purine,
 6-(4-Methylthiophenyl)-9-(β -D-ribofuranosyl) purine,
 6-(9-Phenanthrenyl)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(3-trifluoromethylphenyl)purine,
 6-(2-Phenoxyphenyl)-9-(β -D-ribofuranosyl) purine,
 6-(4-tert-Butylphenyl)-9-(β -D-ribofuranosyl) purine,
 9-(β -D-Ribofuranosyl)-6-(2-trifluoromethoxyphenyl)purine,
 6-(4-Phenoxyphenyl)-9-(β -D-ribofuranosyl)purine,
 6-(2-Naphthyl)-9-(β -D-ribofuranosyl)purine,

6-(3-Biphenyl)-9-(β -D-ribofuranosyl)purine,
 6-[4-(2-Methylpropyl)phenyl]-9-(β -D-ribofuranosyl)purine,
 6-(3-Fluorophenyl)-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(4-trifluoromethylphenyl)purine,
 6-(3-Ethoxyphenyl)-9-(β -D-ribofuranosyl)purine,
 6—[3-(1-Methyl)ethylphenyl]-9-(β -D-ribofuranosyl)purine,
 9-(β -D-Ribofuranosyl)-6-(4-trifluoromethoxyphenyl)purine,
 6-(4-Ethylphenyl)-9-(β -D-ribofuranosyl)purine,
 5-Fluoro-4-methylthio-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 5-Methyl-4-methylthio-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 2',3'-Dideoxy-5-ethyl-3'-methoxyuridine,
 4-(1-Pyrrolyl)-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one,
 4-Oximino-1-(β -L-ribofuranosyl)pyrimidin-2(1H)-one,
 5-Fluoro-4-oximino-1-(β -D-ribofuranosyl)pyrimidin-2(1H)-one; and
 the hydrolyzable esters, hydrolyzable ethers and pharmaceutically acceptable salts thereof.
